



GPC343

Good Practice Guide

Saving Energy - A Whole School Approach


ACTIONenergy



Whole School Approach to Energy Savings

Using this Guide could help your school to save **money**, save **energy** and reduce **environmental impact** by following a **Whole School Approach** to energy management.

Annually, UK schools could save around £60 million by improved management of energy, and reduce CO₂ emissions by 300,000 tonnes.

Every school can save energy but, to be successful a **Whole School Approach** is required. Each person in the school community is an energy user, therefore pupils, teachers, caretakers, administrative staff, cleaners, catering staff, those hiring the school and parents should all be encouraged to play their part.

Engaging pupils in saving energy at school is an excellent opportunity to translate global concerns into local action. This raised awareness of stewardship of finite resources should also be taken home and into future workplaces.

Managing energy should result in achieving organisational objectives at minimum energy cost by:

1. Purchasing energy as cheaply as possible. A guide to help schools is available from The Stationery Office.
2. Minimising consumption while ensuring standards of comfort and service are maintained or even improved, the focus of this Guide.

For the Whole School Approach to be successful it must:

- Recognise that everyone has an equal contribution to make - none are energy experts and all need to work together
- Empower pupils to be pro-active in promoting and guiding the wise use of energy - not just implementing another's decision
- Empower parents, governors and school board members by providing roles and activities suited to their skills.

The Whole School Approach focuses on the human aspect and savings which can be achieved by good-housekeeping (i.e. no cost measures) and some relatively low cost measures. It shows how key aspects of managing energy can be integrated into the education process and the curriculum.

Good design of school buildings and investment in fabric, equipment and controls, though important, are not the focus of this Guide.

" Developing the whole school approach to energy in my school has achieved more than any other topic. It's covered a wide range of National Curriculum provision, helped develop attitudes that set the children up for life, whilst at the same time achieving genuine reductions in school fuel bills".

Primary School Teacher

Managing energy saves money, it also has the following benefits:

Improving Environmental Performance

Carbon dioxide (CO₂) is emitted to the atmosphere from the school boilers and from power stations whilst generating the school's electricity. So saving energy reduces emissions of CO₂, and reduces acid rain and air pollution associated with power stations.

The UK has signed up to a legally binding target to reduce six greenhouse gases (including CO₂) by 12.5% based on 1990 levels by 2010.

Most UK Local Authorities have a target to reduce CO₂ emissions by 1% a year until 2010, by improving the efficient use of energy in all of their buildings, including schools.

Improving Comfort Conditions

Saving energy can often improve working conditions in the school for staff and pupils. (e.g. elimination of draughts or overheating). This provides improved comfort levels and can improve morale and productivity.

Reducing Other Costs

Saving energy often reduces maintenance costs and by operating energy-using equipment efficiently, it lasts longer and capital replacement costs are deferred.

Education Opportunities

Schools provide an excellent opportunity for pupils to be practically involved in responsible stewardship of energy and water as valuable resources, helping them to understand how everyday actions impact on the environment. It also brings to life important elements of the curriculum and gives insights to the goals of sustainable development.

Did you know: UK schools release 5 million tonnes of CO₂ a year, but just one tonne of CO₂ would fill 6 double-decker buses.

Case Study

Needham Market Middle School

An energy efficiency policy is now fully integrated into the schools ethos and planning. Energy studies are incorporated into science, geography and PSHE and cross curricular activities. These activities have brought the children's work to life and increased their motivation.

School electricity bills dropped by £800 in the first year after an energy efficiency policy was integrated into the development plan.

Advice to Others

"You really need a committed group of staff and children from a very early stage, in order to keep the momentum going and to maintain a good level of interest and commitment. It is not a quick fix! It is a slow, steady process of raising awareness among children and their families."

Sue Hull, Headteacher



The Energy Team at St. Andrews and St. Marks School, Surbiton

Case Study

Whole School Approach at St. Andrews and St. Marks Junior School, Surbiton

The Whole School Approach was based on:

- training of Head and Caretaker (similar to current STEP* events for schools)
- formation of an Energy Team: Head, Caretaker and Bursar
- clear policy statement
- energy walk-round and action plan
- good working relationship and support from Local Authority Energy Team
- top-down awareness campaign driven by the Head
- involvement of staff and pupils to save energy and water by no cost measures
- integration of energy issues into the curriculum
- local monitoring of consumption and data analysis involving pupils
- investment in low cost measures (e.g. draught stripping and low energy lamps).

In the year after this initiative there was a 34% reduction in energy consumption (mostly fossil fuel) and a 22% reduction in costs.

Energy was monitored regularly and progress fed back to pupils at assemblies, on notice boards and at staff meetings. Reports were also submitted to the Board of Governors.

* STEP is an Action Energy initiative providing training to school staff on energy issues in their schools. For more information see the insert on key organisations at the back of this Guide.

Energy Team

Who should be on a Team?

In primary schools it is recommended that the team is kept small. A team of three might be appropriate, e.g. Headteacher, Caretaker and Bursar/Administrator.

In secondary schools the team might be larger, e.g. Headteacher or Deputy, Caretaker, Teacher, Bursar/Administrator, School Governor and a pupil.

It is important to get a team with a mix of skills and responsibilities. See the insert at the back of this guide for an outline of possible roles for various team members.



One low cost measure was to relocate the thermostat from the ground floor to the first floor.

School Energy Policy and Action Planning

Developing an energy policy forms an essential part of raising the profile of energy within a school, and should:

- make a statement of commitment
- specify clear objectives
- identify responsibilities and resources
- set clear targets for energy consumption
- provide an action plan
- state the mechanisms to implement the action plan
- highlight the policy review process.

The policy should involve the whole school population and should be developed by the Energy Team in consultation with teaching and non-teaching staff and pupils.

Members of the Energy Team should help to develop and take ownership of the energy policy, which should initially aim to secure commitment from staff and pupils, and provide a one year plan to manage energy in the school.

An example of a typical school energy policy is included as an insert at the back of this document, and can be used to structure your own document.

Action Planning

A practical way of creating an action plan for your school would be to use the energy matrix insert in the end of this Guide, which will help to identify key areas to include in developing a one year plan. The matrix lists tasks under a number of headings, select one or more tasks under each column in the first year and incorporate additional tasks in subsequent years.

The matrix has been designed with items towards the bottom of the columns being easier to put in place. Choose tasks which are appropriate and match resources in your school.

Case Study

Aberdeenshire have been encouraging their schools to use the energy matrix to help in managing their energy use. Their first year saw 10 schools pilot the scheme, which has proved a huge success with notable savings. As a result, the Council is supporting a growing number of schools who have incorporated the matrix into their energy management programme.

Towie School were one of the first to use the matrix to plan activities, resulting in an improved school environment and reduced energy costs.

The Headteacher, Sandra Brown, believes "it has been a meaningful learning experience, allowing pupils and staff to be involved in a real project."

Sera Fromow from Aberdeenshire Council believes that use of the matrix has helped the Council to prioritise maintenance and energy improvements to their school stock. "Money spent by the Local Authority on energy efficiency measures is supported by the schools use of the matrix, which is proving crucial in enhancing energy management within our schools."

Energy Meters and Monitoring

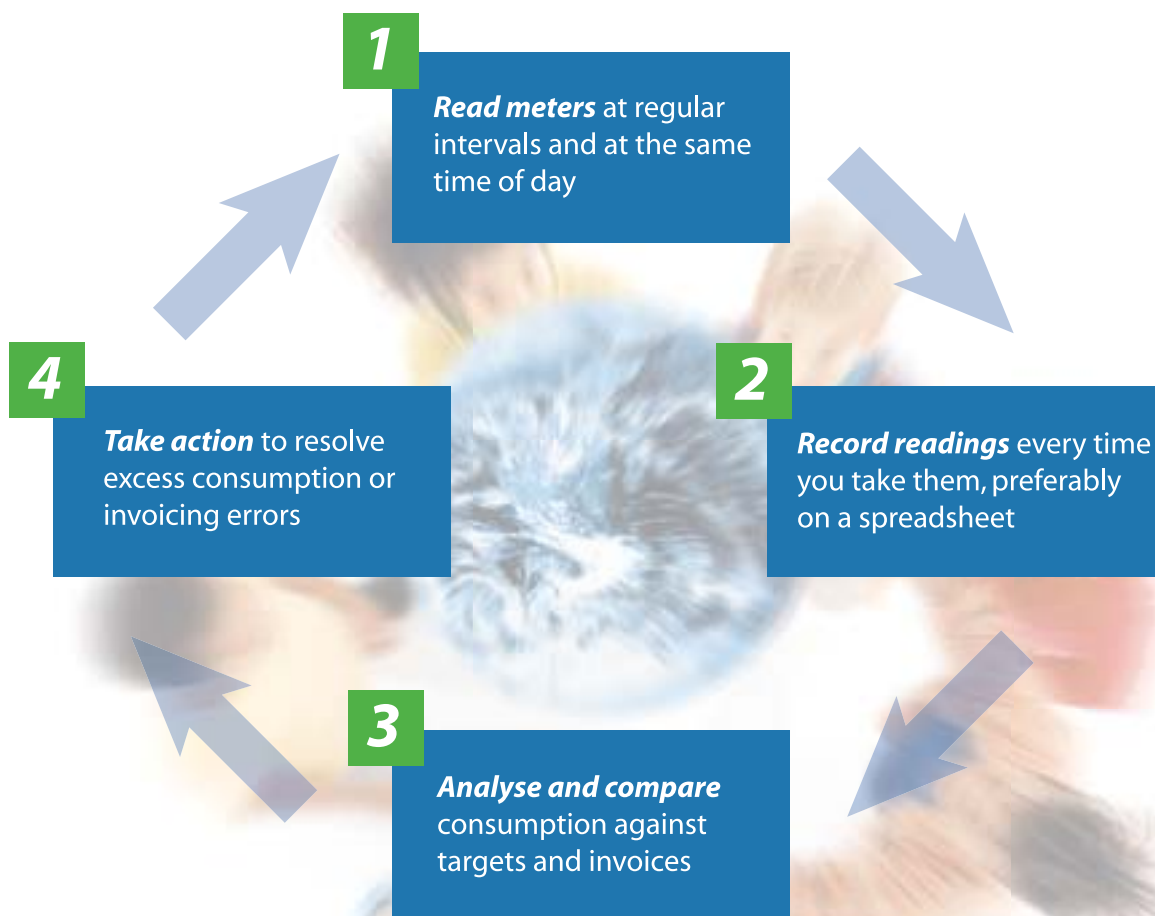
Meters

To manage energy in a school it is vital to have the correct energy data. Some schools rely on data from energy and water invoices, but a better way to obtain reliable data is to read your own meters.

Meters should be read at least monthly, but if you are a larger school you may wish to read meters more frequently.

The benefits of reading your meters are:

- reliable information is used for regular monitoring
- waste can be detected quickly and preventative action taken
- compare your consumption against benchmarks to determine your potential savings
- invoicing errors can be quickly identified and rectified
- feedback can be given to end users on savings achieved
- readings can be used for teaching purposes.



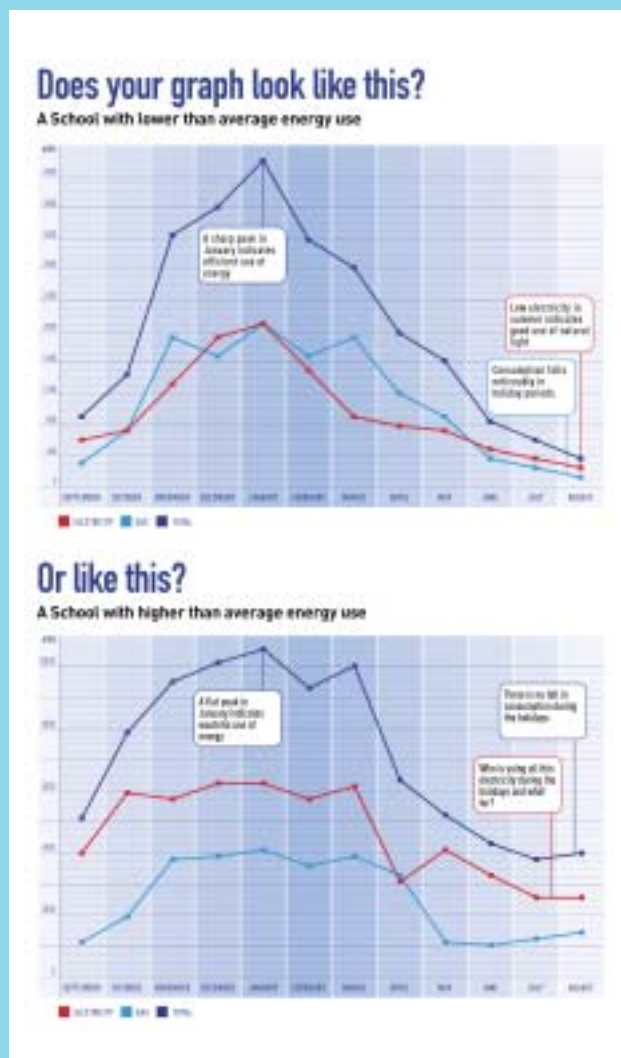
Analysis

Having read the meters it is important to record and analyse the data. If targets have been set it is useful to compare consumption against these targets and plot progress. If there is a change in consumption which cannot be easily explained then corrective action is required.

Plotting monthly energy consumption on a graph for 12 months can be instructive as the analysis of the following graphs show.

Involving Pupils

Reading meters, recording and analysing data provides an ideal opportunity for pupils to get involved in understanding energy use and data handling. If meters are inaccessible ask the caretaker to provide meter readings for the class to use. Children can use spreadsheets, produce graphs and conduct analysis of results. These graphs can then be displayed on notice boards to raise awareness of staff and pupils.



Sample graphs from CREATE's SchoolEnergy wall-chart. Blank wall-charts are available from CREATE to plot the consumption of your school.

Case Study

Hadley Junior School

Headteacher, Mike Jones, involves pupils in checking graphs on a computer. He says *"this helps the children to understand how much energy the school uses and that they can control this by their actions. It supports our efforts in helping the children care for the environment."*

"The system offers schools an ideal opportunity to involve children in data collection and can lead to significant cash savings."

Benchmarking

Introduction

Benchmarking is a method which allows schools to compare their energy performance with other schools.

Most schools are interested to know the potential for saving energy and water on their site. A fast and easy way to determine potential is to calculate the schools performance and then compare this with published benchmarks. Not only will this tell the school which areas to focus their efforts (e.g. electricity, fossil fuel, water) but it will also give an indication of potential savings for each of these resources.

Energy Benchmarks

Benchmarks are calculated separately for fossil fuel and electricity, so that a school can determine performance against each benchmark for each type of energy use. It is possible that performance may be good for electricity but poor for fossil fuel or vice versa.

The range of benchmarks is helpful in determining realistic quantified potential savings, e.g. a secondary school may wish to improve current electricity performance from between 'typical' and 'poor' (say 37 kWh/m²/annum) to 'good' practice (25 kWh/m²/annum) in the next two years.

Benchmarks and information on how to calculate your energy use and CO₂ emissions can be found in the insert at the back of this Guide. The simplest approach to calculating benchmarks is to enter your data into an interactive online tool which can be accessed through the Action Energy website: www.actionenergy.org.uk. The tool allows you to see, graphically, how your school compares with other similar schools (locally and nationally) and allows you to store your information for future reference.

Water Benchmarks

The water benchmarks are also included on the insert at the back of this Guide. The benchmarks have been produced from a survey of over 15,000 UK schools conducted by Watermark. The benchmarks are expressed in m³/pupil/annum.

Further information on benchmarking your water consumption can be found at:

www.watermark.gov.uk/about/bench.asp
www.waterintheschool.co.uk



Energy Walk-Rounds

Effective decision making requires relevant, up-to-date information on how much, and where energy is being used. Monitoring can help identify how much energy can be saved, doing a walk-round will help to determine how it can be saved by:

- identifying what is going on
- eliminating wasteful practices and ensuring they do not recur
- demonstrating commitment to improving energy performance
- identifying opportunities for savings
- providing an opportunity for pupils to get involved.

Members of the school community, including teachers, pupils and caretakers make a visual inspection of each room and area in turn, noting down on checklists where:

- energy is being wasted
- repair or maintenance work is needed (to reduce energy costs)
- there is a need for capital investment (to improve energy efficiency).

Further guidance can be found in Good Practice Guide 57 "Conducting an Energy Walk-Round". Checklists from this publication are included as an insert in this Guide.

Involving Pupils

- The task of identifying the draughtiest door in the school was "subcontracted" to a class, who submitted a report of their investigations. A local DIY company later paid for the installation of draught-proofing
- Appoint energy monitors each term to switch off lights, equipment and close windows every break and at the end of the day, they will be conducting a good housekeeping walk-round several times a day.

Case Study

Elworth Primary School

A class was asked to track down energy wastage and suggest solutions. These special Energy Investigators were split into teams looking into such things as *"The Sunshine Wasters"*, *"The Red Hot Drip"* and the *"Great Draught Hunt"* (briefing sheets are available from CREATE).

Having drawn up plans for their operations, the teams fanned out through the school looking for evidence, interviewing potential witnesses and recording their findings.

Each team assessed their evidence, identified major wastage, discussed how it might be stopped and made a short presentation to the class. Some of their ideas have been implemented and pupils are continuing to help by checking that their changes are effective.



Curriculum

Energy education is already embedded in the curriculum and curricular guidelines for all ages. Sometimes it is explicit, e.g. keeping warm and energy resources, while other times it is not so obvious, e.g. sustainable development and transport. Therefore energy education is an entitlement of all pupils, not an optional extra to be included if there is time.

Teachers already include energy in their normal schemes of work, as energy concepts underpin many of the topics in Science and Geography that pupils are expected to study, even at primary level. In addition, energy impacts on aspects of History and Technology as well as providing a context and/or inspiration for work in other subjects, such as English, Mathematics, Information Technology and the Arts.

Understanding is enhanced if pupils can see practical examples and applications of classroom theory in familiar real-world situations. The school and its energy systems provide many good examples of energy concepts that affect their comfort and facilities.

Teachers know that understanding in any subject will be reinforced if pupils can apply their knowledge. During activities involving energy issues pupils will often ask questions about the way the school uses energy and suggest possible improvements. The Whole School Approach capitalises on this by encouraging pupils to contribute to the responsible use of energy within their school and including them as partners in the process of school energy management.

Education for Sustainable Development

Education for Sustainable Development is being incorporated into the philosophy of several subjects and adopted by schools as an expression of good citizenship. Energy management is a good introduction because:

- it allows pupils to translate general concerns about the environment into practical action within their schools and homes and can be started at any time of the year
- energy consumption is already quantified, so improvements in energy efficiency can be identified quickly and then celebrated by the pupils involved
- wiser use of energy can lead to improved comfort levels together with cash savings which can be put to educational uses
- research has shown that where pupils are empowered to take action on energy, their attitudes to other environmental issues becomes more positive.

CREATE have produced Energyzone leaflets that detail where energy fits within the school curriculum and some projects and activity ideas have been included as an insert at the back of this Guide.

Case Study

Slains Primary School

Pupils keep 'ice cool' at Slains Primary School
35 pupils at Slains School, Aberdeenshire, were involved in an energy conservation project in March 2002. The project involved the whole school in one way or another and was closely linked to the Science & Technology curriculum.

Senior staff, teachers and pupils were involved in preparing an energy policy and action plan. Pupils carried out energy investigations to identify waste and then set up energy teams to carry out simple energy checks every day; they also took regular meter readings to monitor progress. A janitor was involved in tracking housekeeping and maintenance issues relating to energy use. The pupils used the Scottish Science & Technology Network website to help with their project work, which is presented on notice boards and included in school assemblies. Pupils also presented their work at an energy conservation day with invited guests from BP, local newspapers and the Scottish Science & Technology Network. The day included two technology challenges.

Challenge 1 – keep boiling water hot.

Four teams had 30 minutes to each produce a model that would minimise heat loss from a jug of boiling water. When each model was completed, they were filled with boiling water. After 30 minutes the temperature of the water for each team was measured and the team with the hottest water were the winners.

Challenge 2 – keeping ice cool.

This time, the same four teams had to keep an ice cube from melting. Again, the teams were given 30 minutes to build their contraption to act as a fridge.

BP awarded pencil cases and pencils made from recycled materials to the winning teams.

The pupils also stressed the long-term nature of energy efficiency in their presentation to BP 'Remember remember, not just today but forever!'



Pupils at Slains School, Aberdeenshire, attempt to prevent an ice cube melting

"This initiative was an excellent opportunity to integrate a real life energy project into the Environmental Studies 5-14 Curriculum."

Sheila Carson, Headteacher, Slains Primary School

Scottish Science and Technology Network website
www.sstn.co.uk

Energy Awareness Campaigns

All members of the school community should be involved by having the opportunity to:

- report problems and suggest how energy might be used more effectively
- find out what actions are being considered or have already been undertaken
- find out why actions cannot be taken
- contribute to the formulation of policy
- be involved in devising and implementing the Action Plan
- take part in the periodic review of progress.

A central "Energy Notice Board" should be populated with posters, weekly energy consumption information and comparisons, progress on current projects and any other relevant information to be publicised to the whole school community.

A "drip-feed" strategy is better than a "big bang" so maintain momentum through a two or three-year rolling programme of themes, such as:

- doors and draughts in autumn
- heating in winter
- sensors and controls in spring
- windows and lighting in summer
- electrical appliances and hot water at any season.

Themes can be linked to projects with a definite end-point, and the contribution of all participants should be recognised and rewarded in appropriate ways. Ideas for short projects have been included as an insert at the back of this Guide.

Involving Pupils

- A class devised a TV news bulletin devoted to energy issues, including "location reports" from correspondents around the world. This was performed at a special assembly to launch their school's E-Team.



The Crescent Primary School's Year 2 children check out the premises for heat loss, using their personally designed draught detectors. Case Study courtesy of CREATE

Hampshire Schools

Teachers at Warren Park Primary School, Havant, developed an "Eco-Plan", spanning six terms. Each term would be launched with an environmental focus week including energy, health, recycling, grounds, energy (again to monitor savings) and transport.

The Warren Park plan has now been shared with neighbouring schools including Front Lawn School in Havant and The Crescent in Eastleigh. The eco-plan involves the whole school in energy saving activities at school and at home.

Nikki Beaton, at Crescent School and Rhian Williams at Front Lawn School have developed projects that have raised awareness among the whole school community to the need to reduce costs and protect the environment by saving energy. These activities are now firmly embedded into the schools' development plans with energy issue reviewed at regular intervals.

Electrical Equipment

UK schools spent around £250 million on electricity in 1998, which now accounts for approximately 18% of the total energy used in schools, but electricity is typically six times more expensive than gas, representing over 56% of the total energy cost. Real electrical savings, many are at no extra cost, are possible in all schools.

Lighting

Lighting accounts for 20% to 25% of the total energy costs. Savings can be divided into three categories:

- Switch off lights when not required, leaving them on is not cheaper. Appoint children as light monitors to switch off lights in unoccupied areas (e.g. at lunchtimes)
- Maintain existing lights, replace flickering lights as they increase energy consumption. Regularly clean lamps and fittings. Replace "normal light bulbs" with compact fluorescents (CFL's) which last 8 times longer and use 70% less energy
- Invest during new build or refurbishment, seek guidance from your Local Authority or telephone the Action Energy helpline for free advice on 0800 58 57 94.

Computers and ICT Equipment

Energy consumption in computers and ICT equipment can be very high if it is not properly controlled. Typical energy consumption for ICT equipment is shown in the table below:

There are three key methods of saving energy in electrical equipment:

- Activate 'power-down' or energy saving devices built into machines during the working day. Screensavers do not save energy and some actually increase consumption
- Switch off (manually or automatically) at the end of the working day
- Purchase the most energy efficient models (e.g. plasma flat screens for computers consume 20% of the energy of conventional cathode ray tube monitors).

Large savings are possible by switching off equipment and lights when the school is empty.

A PC and monitor left permanently on all year will cost around £63, switching the machine off out-of-hours and activating "power down" when not in use could reduce this cost to £6 per year, a 90% cost saving.

For further information on saving electricity in lighting and equipment see Good Practice Guide 259 "Saving Electrical Energy in Schools".

Involving Pupils

Mathematics: Pupils calculated the purchase and running costs of tungsten filament and equivalent compact fluorescent lamps (CFL) over 10,000 hours, and presented their results as a graph of accumulated costs against time. They found that though initial costs were higher for the CFL, the lower running costs resulted in an overall saving.

| Equipment type | Average power consumption while in use (watts) | Standby energy consumption (watts) |
|---------------------|--|------------------------------------|
| PC (processor only) | 40 | 20-30 |
| PC monitors | 80 | 10-15 |
| Inkjet printer | 40-80 | 20-30 |
| Laser printer | 90-130 | 20-30 |
| Fax machine | 30-40 | 10 |
| Photocopiers | 120-1000 | 30-250 |
| Copy printers | 160-200 | 35-50 |

Renewable Energy

What is it?

Renewable energy is the term used to cover those continuous energy sources which occur naturally or repeatedly in the environment, e.g. energy from the sun, wind and the oceans, from plants, wastes and flowing water. Most renewable energy technologies produce no emissions of gaseous pollutants (e.g. CO₂, oxides of nitrogen/sulphur and particulates).

There are two possible options for exploiting 'green' energy.

Buying from electricity suppliers

In recent years electricity companies have been offering 'green electricity', i.e. electricity guaranteed to have been produced from renewable sources. Usually there is a premium charged and supplies are limited. A number of Local Authorities purchase part of their electricity as green electricity. If your school's electricity is purchased on your behalf by a Local Authority it is worth asking how much is green electricity and if there are plans for future purchasing.

Generating green energy at the school

There are two major issues to renewable projects in schools; cost and suitability for use in schools.

The most suitable technologies for use in schools are:

- Solar energy - photovoltaic and solar water heating
- Wind energy
- Biomass (wood) heating.

Educational factors

Although desirable, it is not essential to have renewable energy technology built into schools in order to demonstrate the technology. Alternatives include:

- Purchasing desk top equipment which demonstrates renewable energy on a small scale, e.g. PV, Solar, Wind
- Visit local schools who have a renewable energy source
- Visit local renewable energy sites (e.g. wind farms).

Further information on renewable energy can be found at www.dti.gov.uk/renewable.

For information on schools that have renewable projects on site, visit the technologies database available through the buildings menu of the Action Energy website: **www.actionenergy.org.uk**

However, it is worth making sure that the school is as efficient as possible before considering large-scale installation of renewable energy systems in a school.



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Hadley Junior School
Elworth Primary School, Sandbach
Slains Primary School, Aberdeenshire County Council
Warren Park Primary School, Havant, Hampshire
Front Lawn School, Havant, Hampshire
The Crescent Primary School, Havant, Hampshire
Hook Infants and Junior School, Hampshire
Towie School, Aberdeenshire
Watermark

Tel 0800 58 57 94

www.actionenergy.org.uk

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Whilst we have taken reasonable steps to ensure that the information contained within this Guide is correct, we give no warranty and make no representation as to its accuracy and we accept no liability for any errors or omissions and nor does Carbon Trust nor the Government.

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Key Organisations

Technical Support

Action Energy

Carbon Trust aims to achieve environmental and economic benefits by promoting cost-effective energy efficiency measures in industry, commerce and public sectors.

Action Energy was introduced by Carbon Trust to help businesses and the public sector cut energy costs through the provision of free, impartial advice and assistance. By contacting the Action Energy helpline 0800 58 57 94 or visiting the website www.actionenergy.org.uk you will be able to find out further information on a range of free services specifically provided for schools. These services include the following:

- training for school staff
- online benchmarking
- free publications including consumption benchmarks, technical information, awareness/publicity material and case studies
- events - free expert speakers and information packs can be provided for organisations (e.g. Local Authorities) that wish to run energy saving seminars for managers of schools under the STEP programme.

Department for Education and Skills (DfES)

A "Purchasing Energy" in schools booklet has been produced and is available for a small fee from The Stationery Office, contact them on 0870 600 5522 or visit their website at www.clicktso.com.

Council for Environmental Education (CEE)

Produces material relating to environmental education including "Evaluating and Inspecting the Environmental Dimension - A Checklist for Schools" and "Incorporating the Environment Dimension of Schools - A Checklist for School Inspectors".

There is a charge for these leaflets.

Council for Environmental Education
University of Reading, London Road, Reading,
Berkshire RG1 5AQ
Tel: 0118 950 2550
Fax: 0118 959 1995
Web: www.cee.org.uk

Curriculum Support

SchoolEnergy

The Energy Saving Trust *SchoolEnergy* scheme encourages a Whole School Approach to energy management and provides curriculum ideas and information packs to help introduce sustainable energy education into the classroom. Useful information on the scheme and supporting information for schools can be viewed at www.schoolenergy.org.uk.

Centre for Research, Education and Training in Energy (CREATE)

CREATE is a national co-ordinating body for energy education. It sells guidebooks, equipment and software, publishes a free teachers' newsletter (Energy Watch) and provides a free enquiry service for pupils, teachers and managers.

A free education pack is available from CREATE which promotes a strong energy saving culture and provides a practical application of positive citizenship.

Energyzone is a free publication, downloadable from the *SchoolEnergy* website that identifies where energy education fits within the curriculum.

Tel: 01942 322271
Email: info@create.org.uk
Web: www.create.org.uk

Groundwork

Groundwork provides regeneration and educational programmes. Specifically trained Groundwork personnel assist groups of primary schools to enhance their teaching of energy awareness and then use pupil's knowledge to improve energy management at schools and in the home.

Tel: 0121 236 8565
Web: www.groundwork.org.uk

Think Energy

Two resource packs on energy aimed at teaching 7-11 year olds and 11-14 year olds (also in Welsh).
Web: www.think-energy.co.uk

Raising Awareness

Energy Chest

A website which encourages younger pupils and teachers to get involved in school energy management.
Web: <http://www.energychest.net/>

Funergy

A range of fun and games about saving energy. Designed for home and classroom use. Links to other energy sites suitable for young people.
Web: www.funergy.org.uk

Renewable Energy

Practical Help (run by the Energy Saving Trust)

Practical Help offers help and support to Local Authorities in all aspects of sustainable energy. The service has produced a briefing note and associated case studies on Local Authority use of renewable energy in buildings and facilities.

Tel: 0870 241 2089
Web: www.practicalhelp.org.uk

The Centre for Sustainable Energy (CSE)

CSE promotes energy efficiency and sustainable energy planning by working with schools, carrying out research and providing a wide range of publications, advice and training facilities.

Tel: 0117 929 9950
Web: www.cse.org.uk

Other Useful Websites

Eco-Schools

Eco-Schools is a European initiative to help schools become environmentally friendly in both the curriculum and the management of the school. The prestigious Eco-Schools flag is awarded to schools which meet the criteria. In the UK Eco-Schools is managed by the Tidy Britain Group.
Web: www.eco-schools.org.uk



Sample School Energy Policy

Note: A copy of this policy can be downloaded and modified from the buildings menu of the Action Energy website.

Sample Energy Management Policy (Draft)

Policy Statement

School is committed to the responsible management of energy and water.

By efficient management of these resources the school aims to minimise expenditure and environmental impact while maintaining health and safety standards and an acceptable comfort level for staff, pupils and other building users.

Targets

Target energy/water performance is as follows:

| | Current Performance 2002/03 | Target Performance 2003/04 | % Target Reduction |
|--|-----------------------------------|----------------------------------|-----------------------|
| Electricity kWh/m ² /annum | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Gas kWh/m ² /annum | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Water m ³ /pupil/annum | <input type="text"/> | <input type="text"/> | <input type="text"/> |

Strategy

This policy statement will be implemented through a ten point plan:

1. Responsibility

The overall responsibility lies with the Headteacher, _____ Day-to-day energy management responsibilities lie with _____ working in conjunction with the policy and direction set by the Energy Team.

Policy, strategy and targets for energy management will be the responsibility of the Energy Team which currently consists of:

_____ Headteacher/Deputy
_____ Caretaker/Site Manager
_____ Bursar/Administrator
_____ Teacher
_____ Governor
_____ Pupil

The Energy Team will meet quarterly to review progress, plan initiatives and prepare an annual energy report for submission to the Board of Governors.

Teachers will have a responsibility to set a good example to pupils who can also make a significant contribution to end-use energy efficiency.

2. Energy Selection and Purchase

Energy purchase is currently undertaken by _____ Council who negotiate with utility providers. _____ will check invoices monthly against meter readings for gas, electricity water.

3. Energy Information

Electricity, gas and water meters will be read weekly and closely monitored against expected usage. Abnormal consumption will be investigated and corrective action taken. Each year realistic energy reduction targets will be set and monitored regularly. Targets will be set relative to national benchmarks published by Action Energy and updated regularly via an on-line benchmarking system accessed through the Action Energy website.

4. Maintenance

Energy conversion plant, distribution systems and energy using equipment will be correctly maintained to avoid energy and water wastage.

5. Awareness

The school will adopt a Whole School Approach involving everyone associated with the school.

Regular awareness initiatives for staff and pupils will emphasise the cost and environmental benefits of saving energy and water and how to avoid waste. Energy saving information will be provided to catering and cleaning staff. Staff and pupils will also be provided with information on how to save energy at home.

Energy Co-ordinators will be appointed with checklists for good housekeeping initiatives.

6. Curriculum

The National Curriculum will be reviewed annually, using literature from CREATE to ensure that the energy element is built into syllabi at appropriate levels.

7. Investment in Energy Efficiency

The school aims to invest in energy saving schemes of less than £1,000 with paybacks of less than three years. Savings achieved by good housekeeping measures will be reinvested in energy efficiency projects.

Where available, grants will be sought to improve energy efficiency. An energy survey of the school will be updated annually with costed proposals.

The school will make use of the no interest 5 year loan scheme operated by the Local Authority for low cost measures and any grant schemes.

8. Design

Energy efficiency will be taken into account in the design of new building projects and during any refurbishment.

Energy efficiency will be considered in the purchase of all new equipment, e.g. computers, catering equipment.

9. Reporting

An annual energy performance report will be prepared by the Energy Team. This will be submitted to the Board of Governors and a summary will be incorporated into the school annual report and school development plan.

10. Policy Review Mechanism

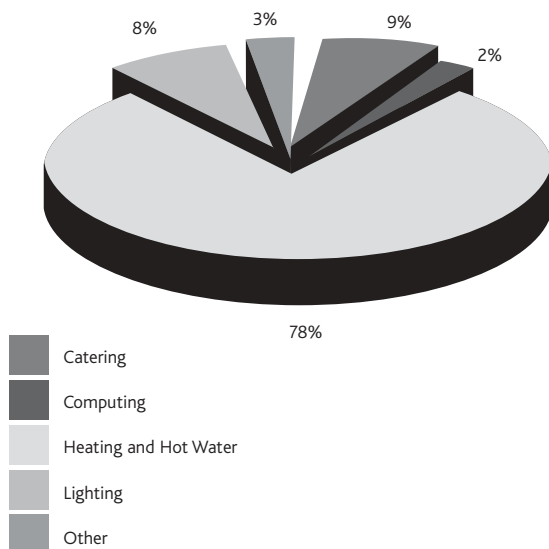
This policy will be reviewed and updated annually by the Energy Team and included in the annual report. The review will include an evaluation progress against the Energy Matrix (see separate insert).

Energy Consumption, Costs & Benchmarks for Schools

In most schools energy is supplied in two forms: fossil fuel (gas, oil, coal or LPG) and electricity. Some schools only have access to electricity or use it more extensively, e.g. for space heating and catering. However, for the majority of schools space heating, hot water and some catering appliances are supplied by fossil fuel.

Electricity use is for lighting, electrical equipment, fans, pumps and some use in catering. The breakdown for energy consumption is as follows:

Energy Consumption for a typical UK school



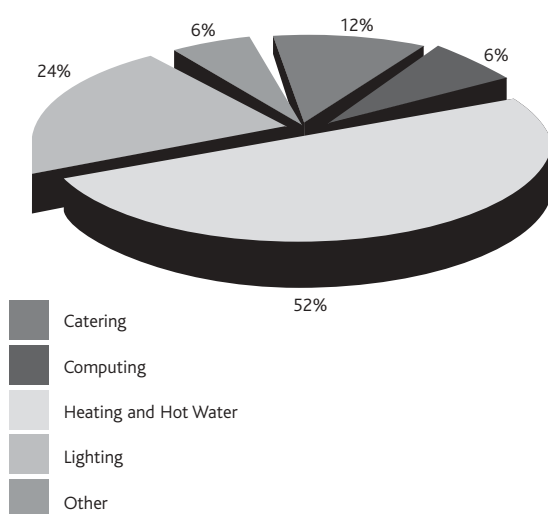
The majority of the energy used in schools is for heating and hot water, which could lead to a school focusing on the heating system to save money.

However, electricity is often 6p/kWh whereas fossil fuel may be as low as 1p/kWh. So while up to 82% of the energy used in a school is fossil fuel it may only represent 44% of the cost.

Therefore, electricity is an important element to control, and with much of the electricity usage being within the control of end users it lends itself well to the Whole School Approach as a first priority in reducing costs.

The pie chart below shows the cost breakdown for energy use in a typical school. Lighting is responsible for nearly 50% of electricity costs, with electrical equipment, catering and fans and pumps making up the rest.

Energy Cost for a typical UK school



Energy Benchmarks

The benchmarks are similar to those used in measuring energy consumption in a car (e.g. miles per gallon). In schools the benchmark is measured in kilo-watt hour (kWh) per m² of heated floor space per annum for fossil fuel and electricity.

| Annual Energy kWh/m ² | Primary Schools (no pool) | | Secondary Schools (no pool) | | Secondary Schools (with pool) | |
|-------------------------------------|------------------------------|-------------|--------------------------------|-------------|----------------------------------|-------------|
| | Fossil Fuel | Electricity | Fossil Fuel | Electricity | Fossil Fuel | Electricity |
| Good practice | 113 | 22 | 108 | 25 | 142 | 29 |
| Typical | 164 | 32 | 144 | 33 | 187 | 36 |
| Poor practice | 224 | 45 | 191 | 41 | 233 | 41 |

Table 1 Interim benchmarks calculated from 1999-2000 data for 2000 schools

Based on consumption data for 2000 schools in England in 1999-2000. Typical value is the median value of the data. This is the value for which 50% of data points will be higher and 50% lower.

25% of schools sampled performed better than the good practice benchmark and 25% performed worse than poor practice.

It is possible to calculate Carbon Dioxide (CO₂) emissions using the following factors. This can also be done automatically using the on-line benchmarking tool for schools available through the Action Energy website.

| CO ₂ Emission by Fuel Type for the UK | | | |
|--|-----------------------------|---------------------------|-------------------------|
| | England, Scotland and Wales | | Northern Ireland |
| | kg CO ₂ /kWh | kg CO ₂ /litre | kg CO ₂ /kWh |
| Electricity | 0.52 | - | 0.72 |
| Natural Gas | 0.19 | - | 0.19 |
| Gas/Diesel Oil | 0.25 | 2.68 | 0.283 |
| Liquid Petroleum Gas (LPG) | 0.23 | 1.65 | 0.236 |
| Renewables | 0 | 0 | 0 |

Table 2 CO₂ emissions for different fuels types

To calculate your school's carbon dioxide emissions multiply your consumption (in kWh) by the CO₂ factor, see below.

| Fuel | Annual kWh | | CO ₂ factor | | Annual kg CO ₂ |
|-------------|------------|---|------------------------|---|---------------------------|
| Natural Gas | 1,134,000 | X | 0.19 | = | 215,460 |
| Electricity | 266,000 | X | 0.52 | = | 138,320 |
| Total | 1,400,000 | | | | 329,840 |

Example summary of CO₂ emissions

Water consumption in schools has also been benchmarked. Water can be very costly in schools as you are often paying twice for using it; once for the supply and again for its disposal. By benchmarking you can get an idea of the potential savings available if good practice values were met.

| Water Consumption in m ³ /pupil/annum | | | | |
|--|------------------------|----------------------|--------------------------|------------------------|
| School Type | Primary (with pool) | Primary (no pool) | Secondary (with pool) | Secondary (no pool) |
| Good practice | 3.12 | 2.63 | 3.38 | 2.74 |
| Typical | 4.25 | 3.68 | 4.86 | 3.82 |
| Poor practice | 5.37 | 5.31 | 7.05 | 5.75 |

Table 3 Water benchmarks for schools kindly provided by Watermark

| | | | | | | |
|--|---|--|--|--|--|--|
| Date of inspection: _____ | Make a schedule of spaces in your school and note items needing attention | | | | | |
| Good Housekeeping Checklist | | | | | | |
| Action required when space is occupied <ul style="list-style-type: none"> • Check if there are complaints about comfort conditions _____ • Check room thermostats on correct temperature _____ • Check heating controls (e.g. thermostatic radiator valves) on correct setting _____ • Switch lights off (if daylight sufficient) _____ • Close windows and doors (if heating is on) _____ • Avoid use of portable electric heaters (except as a last resort) _____ • Avoid use of high energy consuming equipment e.g. kilns, during maximum demand period for electricity _____ • Avoid obstructions in front of radiators or heaters _____ • Report if room is suffering from under or over heating _____ | | | | | | |
| Action required on leaving space unoccupied <ul style="list-style-type: none"> • Switch off lights, where it is safe to do so _____ • Close windows and doors _____ • Turn heating off (where non-automatic) _____ • Close curtains or blinds (at end on daylight) _____ • Turn off equipment and machinery, especially computers and photocopiers _____ • Is there a pupil monitor for this room (or where classes move for each class) _____ | | | | | | |
| Staff and Pupil common rooms <ul style="list-style-type: none"> • Taps are turned off after use _____ • Lights on only when daylight levels are inadequate and room is occupied _____ • Turn off electric water heaters during teaching time and the end of the day _____ • Identify any energy consuming items during unoccupied times, can these be turned off? _____ | | | | | | |
| Changing rooms and toilet areas <ul style="list-style-type: none"> • Turn off hot and cold taps _____ • Turn off showers _____ • Switch off extract fans _____ • Turn off electric water heaters _____ • Check hot water temperatures _____ | External Lighting <ul style="list-style-type: none"> • Switch night time lighting off when not needed _____ Swimming Pool <ul style="list-style-type: none"> • Replace swimming pool cover _____ • Check pool and air temperature regularly _____ | | | | | |

Roles & Responsibilities

Actions are divided into 'essential' and 'desirable'. A tick means the person in a particular job function is likely to be well suited to the task. For some tasks a number of different people could be involved (e.g. energy walk-rounds). Other tasks are of a more specialist nature (e.g. energy purchasing). A tick with a grey background indicates the person who is likely to be the best choice for the task.

| Who can do what? | Headteacher/ Deputy | Teacher | Governor | LA Energy Manager | Pupil | Bursar/ Administrator | Caretaker/ Site Manager | Energy Co-ordinator |
|--|------------------------|---------|----------|----------------------|-------|--------------------------|----------------------------|------------------------|
| <div>✓ Best suited for task</div> <div>✓ Could do the task</div> | | | | | | | | |
| Actions | | | | | | | | |
| Essential | | | | | | | | |
| Policy and planning | ✓ | ✓ | ✓ | | | ✓ | | ✓ |
| Identify responsibilities/energy team | ✓ | | | | | | | |
| Leading role in whole school approach | ✓ | ✓ | | | | | | |
| Identify curriculum opportunities | | ✓ | | | | | | ✓ |
| Raise awareness of staff and pupils | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| Active participation in no cost measures | | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| Read meters regularly | | | | | | | ✓ | ✓ |
| Record/analyse/monitor energy consumption | | | | | ✓ | ✓ | | ✓ |
| Identify areas of avoidable waste | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Review progress towards targets and benchmarks | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| Desirable | | | | | | | | |
| Conduct energy walk-rounds | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Advise on technical measures | | | | ✓ | | | ✓ | ✓ |
| Advise on energy purchasing | | | | ✓ | | | | |
| Contribute to curriculum issues | ✓ | ✓ | | | ✓ | | | ✓ |
| Identify all energy using systems/equipment | | | | | ✓ | | ✓ | ✓ |
| Identify controls, timers, set points | | | | | | | ✓ | ✓ |
| Maintenance of energy using equipment | | | | | | | ✓ | |
| Sanction appropriate investment | ✓ | | ✓ | | | ✓ | | |
| Apply for relevant grants | ✓ | | | | | ✓ | | ✓ |
| Provide regular progress reports | | | | | | ✓ | | ✓ |

Ideas for including Energy within the Curriculum

| | | | |
|--------------|---|---------------------------------------|----------------------|
| Box A | | | |
| Key:- | (LP) Lower primary (US) Upper secondary | (UP) Upper primary (SF) Sixth-form | (LS) Lower secondary |
| LP | Categorising rooms as “hot”, “cold” or “comfortable” and relating these sensations to numerical values on a thermometer. | | |
| LP | Identifying, classifying and counting the numbers of appliances that use energy in a school. | | |
| LP-UP | Devising a play or pageant for a special assembly or for a performance to parents. | | |
| UP-LS | Using a lighting survey as the basis for work in Mathematics. e.g. Illuminated Numbers available from CREATE. | | |
| UP-LS | Challenging pupils to design energy awareness posters and “Save it” stickers and then to carry out experiments to determine how frequently they should be changed to maintain their impact. | | |
| UP-LS | Weekly reading and recording of electricity and gas meters. Calculating consumption for each meter and for the whole school. Comparing total consumption with previous week/month and the same period in earlier years. | | |
| US-SF | Comparing consumption with weather severity, school benchmark, local authority and national data. | | |
| LS-SF | Investigating the sensors and controls used to regulate heating and lighting systems. Constructing simple working models to test understanding. | | |
| UP-SF | Using data-loggers to record the temperature of a room over a period, say Thursday to Tuesday, to see if it only reaches target temperature at appropriate times. | | |
| UP-SF | Writing articles for local newspapers and radio on how the school is working to use energy more wisely. | | |
| All | Inviting a professional theatre company to present a play on energy issues. | | |
| All | Devising events for families and other members of the community where pupils present information and advice on energy efficiency in school (and at home). This can involve quizzes, games, comedy sketches, dance, mime, music, song and art. | | |

Ideas for short projects

| | |
|---------------------|---|
| • Stick-'em-up day | Pupils (and adults) put up descriptive post-it notes wherever they see energy being wasted. |
| • Low energy day | Just how little energy can the school use and still operate successfully? |
| • Energy challenge | A reward if the school reduces its consumption by an agreed amount. |
| • Pay your way day | Each pupil is issued with energy tokens. They have to “buy” energy whenever they need it by handing in tokens. |
| • Visit | Energy expert leads an activity, perhaps involving adults as well as pupils. |
| • Energy detectives | Pupils seek out places where energy is being wasted. |
| • Energy survey | Students collect and evaluate evidence to support or refute statements about the effectiveness of different aspects of energy management. |

Energy Matrix

| Energy Team | Walk-round | Monitoring | Curriculum - to include environmental impacts | Communication | Savings |
|---|---|---|--|---|---|
| 1.1 Energy Team members make regular reports to the school and board of governors | 2.1 Measures to improve energy performance of school buildings are planned and projects implemented | 3.1 Monthly data is analysed, allowing fault finding, savings and budget information to be determined | 4.1 School energy use and results of walk-round are used as a basis for class discussions and project work | 5.1 Energy saved expressed as money and carbon savings are broadcast to the school in a way the children can understand | 6.1 Some savings are re-invested to reduce energy use further, or for buying higher efficiency equipment (e.g. computers) |
| 1.2 Team members have defined roles and report back on these at meetings | 2.2 Identify shortlist of key measures to be taken and communicate to the whole school | 3.2 Comparison of monthly consumption against previous year's usage and against set targets | 4.2 Energy is used as a cross-curricular theme across subjects | 5.2 School runs an energy awareness campaign | 6.2.1 School achieves / maintains energy use at Best Practice levels |
| 1.3 Meets at least once per term | 2.3 Results included in the school Energy Action Plan | 3.3 Previous year's energy consumption data used for setting the following year's target | 4.3 School makes use of available energy related curricular material or produce your own | 5.3 Assemblies are used to inform whole school of progress | OR 6.2.2 School has made energy savings over previous year's consumption |
| 1.4 Team includes Senior teaching staff, caretaker, governor, pupil monitors | 2.4.1 Complete walk-round at least once per term | 3.4 Energy benchmarking web site kept up to date by inputting date | 4.4 Energy is included at each key stage (England & Wales), Level (Scotland) | 5.4.1 An energy notice board in a public place is kept upto date with progress | 6.3 School has maintained energy use at previous year's consumption level |
| 1.5 Energy Team set up with an Energy Leader for the team | OR 2.4.2 Whole Energy Team complete walk-round once per year | 3.5 Monthly recording of gas, electric & water from meter readings | 4.5 Energy issues covered in some classes | OR 5.4.2 Involvement in scheme is publicised to whole school | 6.4 Savings made can be identified using monitored information and quantified in monetary terms |

| | | | | | |
|---|---|--|--|--|--|
| Date of inspection: _____ | Make a schedule of spaces in your school and note items needing attention | | | | |
| Repairs and Maintenance Checklist | | | | | |
| • Install / repair / replace thermostat _____ | | | | | |
| • Install / repair / replace thermostatic radiator valves _____ | | | | | |
| • Clean air filters in fan convector heaters _____ | | | | | |
| • Install / repair/ replace controls to heating (specify control) _____ | | | | | |
| • Install / replace draught seals to doors and windows _____ | | | | | |
| • Install / lubricate / adjust door self closing mechanism / hinges _____ | | | | | |
| • Clean windows and roof lights _____ | | | | | |
| • Replace damaged glazing _____ | | | | | |
| • Repair / replace damaged window frames _____ | | | | | |
| • Clean lights and light fittings _____ | | | | | |
| • Replace flickering flourescent tubes _____ | | | | | |
| • Replace 38mm flourescent tubes with higher efficiency 26mm tubes _____ | | | | | |
| • Consider replacing tungsten bulbs with compact flourescent lamps _____ | | | | | |
| • Install / rearrange / reposition switching / controls to lighting _____ | | | | | |
| • Install / top up insulation in roof space _____ | | | | | |
| • Install / replace insulation to pipework _____ | | | | | |
| Boiler / Plant Rooms <ul style="list-style-type: none"> • Service / replace boiler(s) _____ • Check combustion efficiency and flue gas temperatures of boiler(s) _____ • Check / reset time clock settings _____ • Check sequencing of boiler(s) (where appropriate) _____ • Install / reposition / replace insulation to hot water cylinder _____ • Install / reposition / replace insulation to pipework _____ | Changing rooms and toilet areas <ul style="list-style-type: none"> • Install over-run timers to extract fans _____ • Repair dripping tap(s) and shower(s) _____ • Repair overflows from storage cisterns _____ • Install water-saving controls to urinals _____ Swimming Pool <ul style="list-style-type: none"> • Install / repair / replace cover to swimming pool _____ | | | | |